Nifti Images in webGL

Version 1.0

Prepared By

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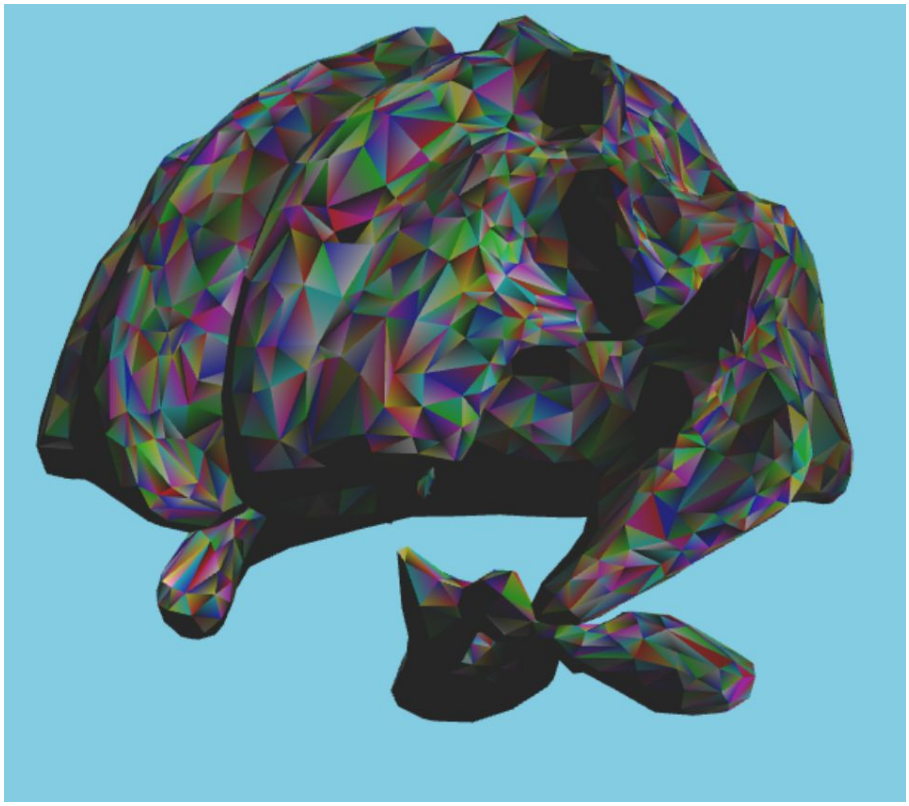

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Project Design Document

1 INTRODUCTION

3D Rendering of medical images is a problem for which there is an abundance of interest. This particular application will allow for the rendering and exploration of a Nifti file in a web browser. The application will allow input of a nifti brain image into the browser, and subsequent 3D rendering of that volume. The application will also allow for rendering and animation of 4D time series data.

2 FUNCTIONAL REQUIREMENTS

2.1 The application will allow an end-user to load a .nii (Nifti) file through an input in the web browser.

2.2 The application will hide conversion and tessellation of volume(s) from the end-user.

2.3 The application will allow user to view animation of 4D time series data.

2.4 The application will allow rotation and scaling of model.

3 MATERIALS AND RESOURSES

3.1 WebGL

3.2 MATLAB

3.2.1 MRIcroS

3.3 MeshLab

3.3.1 Quadric Edge Collapse Decimation

3.4 Python

4 DESIGN OVERVIEW

4.1 Nifti files will first be tessellated using the MRIcroS MATLAB library. This process will output a .ply surface mesh file. Meshlab will then be used to read the binary .ply file, apply quadric edge collapse decimation to reduce the number of vertices and thus increase performance. Meshlab will also serve the purpose of converting the binary .ply format to the ascii .obj format. A python script will be employed to parse the .obj file and create javascript arrays of vertices and faces. The entire process from the nifti to the JS files is encapsulated in a python script.

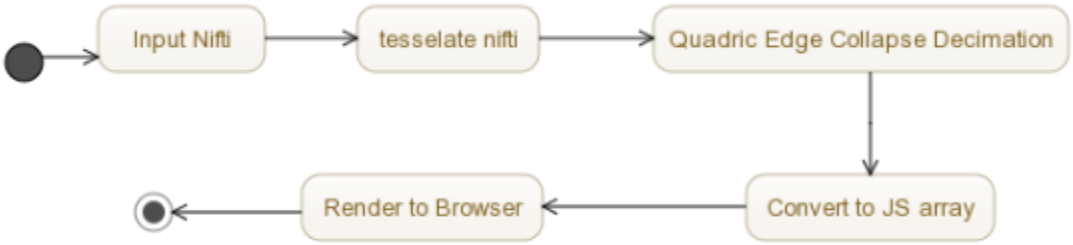

Figure 1 : Diagram showing workflow

The javascript array will be loaded into webGL using the MV.js package and rendered to the browser. The application will also allow brain images to be grey/white segmented. The exact procedure for doing this has not yet been decided upon. It will likely include create a white matter model and a grey matter model and rendering both at the same time.